MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2018/2019

TAT 3131 – AGENT TECHNOLOGY

(All sections / Groups)

13 October 2018
2:30pm – 4:30pm
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This Question paper consists of **SIX pages**, which includes the front cover, with **FIVE Questions** only.
2. Attempt **ALL** questions. All questions carry equal marks and the distribution of the marks for each question is given.
3. Please print all your answers in the answer booklet provided, and start each question on a new page.

Question 1 [12 marks]

(a) Two continuing trends that drive advancements in computing technologies are *ubiquity* and *human orientation*. Discuss these two trends that support such advancements.

[4 marks]

(b) One of the questions about how multiagent systems stand with respect to other academic disciplines is that *aren't multiagent systems all just artificial intelligence*? Clarify this statement.

[2 marks]

(c) Explain the following phrases:
(i) Synthesis algorithm is *sound*.
(ii) Synthesis algorithm is *complete*.

[2 marks]

(d) Explain the following properties of a task environment:
(i) Fully accessible
(ii) Fully deterministic
(iii) Discrete
(iv) Static

[4 marks]

Continued.....

Question 2 [12 marks]

(a) State and then explain two key problems that shall be solved when designing a symbolic reasoning agent.

[4 marks]

(b) An example of reactive agent is a mobile robot built by Brooks (1986). The mobile robot has a *subsumption architecture*. Describe this *subsumption architecture*.

Reference

Brooks, R. (1986), "A Robust Layered Control System for a Mobile Robot", *IEEE Journal on Robotics and Automation*, vol. 2, no. 1, pp. 14-23.

[4 marks]

(c) A multiagent system has a form of organisation that defines roles, relationships and authority structures among its members (in this case, members are referred to as *agents*). Two types of organisation of a multiagent system are:

(i) Hierarchies

(ii) Coalitions

Explain the characteristics of the above two types of organisation.

[4 marks]

Continued.....

Question 3 [12 marks]

(a) (i) Explain the following two phrases: *first price* and *open cry*.

[1 mark]

(ii) The Dutch and the first price seal-bid auctions are the famous methods to allocate a resource to one of the bidders. Describe each of these two auctions.

[3 marks]

(b) Describe the rules of monotonic concession protocol.

[6 marks]

(c) What is *argumentation*? List two modes of argumentation.

[2 marks]

Continued.....

Question 4 [12 marks]

(a) Explain the following phrases:
(i) self-interested agents
(ii) utility function

[2 marks]

(b) The table below shows the profits of two e-commerce companies (Lavenda and 12Street) of cutting or not cutting selling price of goods. The profits of the two companies are indicated in an amount in the unit of RM 1000.

		12Street			
		Cut price		Do not cut price	
Lavenda	Cut price	120	120	160	100
	Do not cut price	100	160	140	140

(i) What is the dominant strategy of Lavenda? Give a reason.

[3 marks]

(ii) What is the dominant strategy of 12Street? Give a reason.

[3 marks]

(iii) Are the strategies chosen by Lavenda and 12Street reflecting a situation similar to the dilemma of the prisoners? Explain why.

[2 marks]

(iv) Are the strategies chosen by Lavenda and 12Street in a Nash equilibrium? Explain why.

[2 marks]

Continued.....

Question 5 [12 marks]

(a) The knowledge interchange format (KIF) is a language used for expressing message contents.

(i) What are the three types of message contents that KIF can be used to state?

[3 marks]

(ii) The knowledge query and manipulation language (KQML) and KIF are used to exchange messages among agents. Convert the following dialogue into KQML/KIF format.

Agent1 asks Agent2: Is a giraffe taller than a tiger?
Agent2 replies Agent1: Yes
Agent2 tells Agent1: It is true that a giraffe is taller than a tiger.

[3 marks]

(b) "Inform" and "Request" are the two basic communicative verbs. (or performatives). The meaning of inform and request are defined in two parts, namely pre-condition and rational effect. Compare pre-conditions of a sender who communicates using one of the two performatives at a time.

[4 marks]

(c) The speech act can be categorised into *representative*, *inquire*, *directives*, *commisives*, *expressive*, and *declarations*. For each statement below, identify a type of speech act.

(i) I promise to wrap the gift.
(ii) Is the gift wrapped?
(iii) Please wrap the gift.
(iv) Thank you for wrapping the gift.

[2 marks]

End of Paper